Attachment 3. Proposed Chopper/Shredder Ventilation System Modifications

The Waste Management Division at Lawrence Livermore National Laboratory proposes to not install local blowers and housekeeping filters in the chopper/shredder ventilation system that were specified in the Operations Plan. The local blowers are not necessary as the building blowers provide enough static pressure to safely operate the units. In addition, the housekeeping filters provided insignificant benefit in comparison to the added health risk to workers during filter maintenance. The discussion below provides a background on the system design and the rationale for not installing these devices.

Background

In the early design stages of the Decontamination and Waste Treatment Facility (DWTF), it was thought that the ventilation system for the size reduction unit, (shredder and chopper), required (for each) a housekeeping filter, followed by a separate HEPA filter, followed by a blower before the exhaust was routed to the building ventilation system. This early design information was incorporated into the hazardous waste facility permit application. After the building ventilation system was fully designed, it became obvious that the need for a blower after the HEPA filters was not warranted due to the large capacity of the building ventilation fans. It also became apparent that having a housekeeping HEPA in a addition to a second HEPA filter, with the housekeeping HEPA filter having the sole purpose of minimizing contamination to a short run of ductwork, provided no significant benefit.

The final design of the shredder ventilation system did not incorporate the housekeeping HEPA or the blower. As such, the system was built without the inclusion of this local filter and blower.

Justification for the Non-Inclusion of the Local Blower

The building ventilation system (a.k.a. building emissions pollution abatement equipment) has three parallel banks of HEPA filtration. Each bank has its own set of pre-filters and HEPA filters along with its own fan, motor and motor control. Each fan is capable of a flow rate of approximately 37,500 cfm at a static pressure of 10" water gauge. Each HEPA filter has an initial pressure drop of no greater than 1.0" water gauge, while the pre-filters have an initial pressure drop of 0.28" water gauge. Combining the pressure drop across the building's HEPA filtration bank with the local HEPA filtration bank for the chopper and shredder results in a total initial pressure drop of 2.56" water gauge. This leaves slightly less than 7.5" water gauge in excess. All other sources of pressure drop are insignificant.

When the pressure drop across any of the HEPA filtration banks reaches 5" water gauge, the differential pressure gauges for the individual banks are inspected to determine if the pre-filters, HEPA filters, or both need to be replaced. If one of the HEPA filtration banks does become clogged and produces a pressure drop of 5" water gauge, there is still 2.5"

water gauge in excess for the fans to operate. If the local HEPA filtration bank became clogged, all shredder and chopper operations would cease until the pre-filters, HEPA filters and/or both are replaced.

It is extremely unlikely for both the local HEPA filtration bank and all three building ventilation HEPA banks to become clogged at the same time. Again, the building ventilation has three HEPA filtration banks in parallel, so if one becomes clogged or the fan/motor requires maintenance, there are still two banks in operation. The overall flow rate would be reduced during this period, but there will still be enough static pressure to overcome any pressure drop produced by the overall system.

Furthermore, the ventilation systems for the shredder and chopper have a maximum flow rate of 2500 cfm. At this flow rate there is a maximum velocity through the shredder of approximately 230 fpm.

The building ventilation blowers clearly have sufficient capacity for safe operation of the shredder and the HEPA filters without a local blower. By eliminating this blower, there is a reduction in maintenance activities, which could result in external contamination. The possibility of external contamination is reduced since there will be less leak paths associated with the ductwork due to fewer fittings and pipe details.

Based on the flow rate and excess static pressure of the system, the need for a second blower local to the shredder and chopper was not warranted. With the building ventilation system having three separate fans, there is sufficient redundancy already accounted for in the ventilation system thereby further reducing the necessity of a second blower.

Justification for the Non-Inclusion of the Local Housekeeping HEPA Filter

It is important to note that the current local HEPA filtration bank was placed as close to the shredder and chopper unit operations as possible while maintaining the need for the HEPA housing to have the bag in/bag out capability. The current local HEPA filtration bank is mounted on the mezzanine floor directly above the shredder and chopper rooms. The exhaust from the shredder and chopper has to travel approximately 20’ and 60’, respectively, before encountering the local HEPA filtration bank (see attached photographs).

Having a HEPA filter closer to the size reduction units would have only served the purpose of minimizing contamination of the short run of ductwork. This housekeeping HEPA filter would not have provided any safeguards to the public or environment from unit operations. Furthermore, to help ensure worker safety all ductwork is considered to be internally contaminated until swipe results, which comply with 10 CFR 835, show otherwise, whether or not a HEPA filter is upstream or not.

Any HEPA filter placed closer to the units than the current local HEPA filters would not have been able to have the bag-out capability due to space limitations. Bagging-out

HEPA filters during replacement is the nuclear industry standard. The operators would have had to be standing on a "man-lift" or other type of equipment in order to reach the ductwork where the proposed local HEPA filter would have been located. They would then have to replace the HEPA filter and housing since it would not have been a bag-out type of housing. This replacement would have produced significant contamination issues along with other industrial safety issues (e.g., working at elevated heights).

Since the filter was not necessary for the protection of human health or the environment, it was not described in the *Health Risk Assessment* and no credit was taken for the filter in determining health impacts. This filter was also not included in Figure XIV.4-3, Conceptual Process Flow Representation of the Air Emission Control Systems, since it was not considered to be part of the total building ventilation system. Based on the contamination issues concerning replacing the previously proposed local HEPA filter and considering there would be very little benefit of having a local HEPA filter installed, it was not included in the final design. The exhaust from both units pass through a pre-filter followed by a HEPA filter before being routed to the building ventilation system which also has a pre-filter and HEPA filter combination. Therefore, there is adequate redundancy to prevent particulate release to the atmosphere. A third HEPA filter would not have ensured the prevention of release to the atmosphere to any greater degree, it would only have minimized internal contamination of the ductwork, but would have increased the possibility of external contamination through additional leak paths and during replacement activities.